Research Study No. 60

SOIL TESTING SERVICE IN RAJASTHAN

(A Case Study of Sriganganagar Soil Testing Laboratory)

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FOREWORD

Recognizing the importance of soil testing service in the context of increasing fertilizer consumption, the Ministry of Agriculture & Irrigation, Government of India, had asked several Agro-Economic Research Centres to undertake an evaluation study on the working of soil testing service. This Centre was asked to take up such a study in Rajasthan.

The organisational set up and working of soil testing service in Rajasthan have been examined in this study on the basis of available secondary data. A field survey covering 60 beneficiary households and 40 non-beneficiary households was also conducted for the reference year 1979-80 in order to assess the impact of this service on the farmers' fields.

The present study reveals two satisfactory aspects about the soil testing service in Rajasthan. Firstly, the available data suggest that the work of soil testing service has expanded considerably during the last two decades. Secondly, it also reveals that, by and large, the method adopted for collecting soil samples has been scientific and satisfactory.

The present study has thrown up some disturbing results also. For instance, it has been reported that fertilizers have not been used on any of the soil tested plots as per the recommendations. Similarly, the yield rates have been found to be higher on farms using less than the recommended doses of nutrients NP and NPK. These results deserve to be looked into more carefully for making this service more effective.

Although soil testing service has expanded significantly during the last two decades in Rajasthan, there is a need for opening more laboratories in order to enable the farmers to avail of the benefits of this service more easily. There is also a need for more effective follow up extension effort for getting better results. In this connection the author has put forward several specific recommendations for improving the working of this service in Rajasthan.

Shri R. D. Sevak has put in sustained hard work to study this crucial but relatively neglected area of research. He received valuable assistance from Sarvashree C. F. Patel, H. M. Verma and S. D. Purohit. Shri S. D. Purohit has helped in the field work, while Shri H. M. Verma was associated with field work as well as data sheet preparation. Shri C. F. Patel was associated with this project at all stages. Shri R. M. Patel, Deputy Director, provided valuable encouragement to the project team and offered useful suggestions/comments. Dr. C. H. Babaria, who has done a useful study on this subject for Gujarat, provided valuable help in the initial stages of this project work. The Machine Tabulation Unit of the Centre has competently handled the work of data processing.

It is hoped that this study will be found useful by those concerned with the problems of agricultural development in Rajasthan.

Vallabh Vidyanagar
September 9, 1982

Mahesh Pathak
Honorary Director

A C K N O W L E D G E M E N T S

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1. Office of the Joint Director, Agriculture (Soil Survey), Govt. of Rajasthan, Jaipur.

2. Office of the Deputy Director, Agriculture (Quality Control & Soil Survey), Govt. of Rajasthan, Durgapura (Jaipur).

3. Office of the Asstt. Soil Chemist, Soil Testing Laboratory, Sriganganagar.

4. Office of the District Agriculture Officer, Sriganganagar.

5. Sarpanch of the selected villages.

6. Our Respondents.

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C O N T E N T S

C O N C L U S I O N A N D S U G G E S T I O N S

The present research study was undertaken to examine : (i) the organizational set-up of soil testing service in the State, (ii) working of soil testing service in the State particularly with reference to Sriganganagar soil testing laboratory (SSTL) and (iii) the extent of adoption of soil testing service and the factors associated with non-adoption at farm level in Sriganganagar district.

The review of performance of soil testing laboratories, particularly of SSTL, is based on data available for 5 years period from 1974 to 1979. The extent of adoption at farm level and factors associated with non-adoption of soil testing service have been ascertained by a sample survey of 60 beneficiary households and 40 non-beneficiary households from six different villages of Sriganganagar tehsil from Sriganganagar district which falls under the juridication of SSTL. The reference period for the farm level data was agricultural year 1979-80.

I

Soil Testing Service in the State

There are 4 soil testing laboratories situated in different parts of Rajasthan. In addition one mobile van is kept at Durgapura laboratory, Jaipur. The Joint Director, Agriculture (Soil Survey) is in-charge of this service at State level. He is assisted by a Deputy Director, Agriculture (Quality Control & Soil Survey), Durgapura. Soil testing service has made

satisfactory progress. The capacity for testing soil samples has increased from 5000 per annum in 1960-61 to 90,000 per annum in 1979-80. The actual number of soil samples tested has moved up from 7569 in 1960-61 to 80,545 in 1979-80.

Considering 5 years (1974 to 1979) period together, the best performance in terms of soil samples to be tested against set targets was given by Durgapura STL (108%) and the lowest achievement was at Sriganganagar STL (71%). All the laboratories put together had achieved 88 per cent of the target for the five year period.

The co-ordination between extension staff and laboratory staff was found to be poor at the State level as well as at the laboratory level. Of the total number of tehsils served by all the laboratories, about 71 per cent of the tehsils were at a distance of more than 100 kms.

II

Working of Sriganganagar Soil Testing Laboratory (SSTL)

Significance of SSTL :

This laboratory has analysed 70,000 soil samples during 1974-79. It has found that in Sriganganagar district, the nutrient K, i.e. potash is declining in the soil year after year. This laboratory was established in 1968-69 and the area of its juridication at present is Sriganganagar and Bikaner districts. Water tests are also carried out in this laboratory. The annual capacity of testing the soil samples in 1979-80 was 20,000 per annum and the per day maximum capacity was 100.

Performance of SSTL :

During the period 1974-79, excepting 1977 and 1979, the soil samples tested were below the set target. It was found that the proportion of soil samples received through BDO was declining over the years.

The preponderent share of the total soil samples was claimed by Sriganganagar district and tehsil as compared to other districts and tehsils falling under the jurdication of SSTL. The highest number of soil samples were tested for cotton followed by wheat. The other crops did not reveal any trend. Majority of the soil samples received at SSTL were during pre-kharif and pre-rabi period. The results of soil test were not always despatched in time prior to kharif and rabi seasons because of the prevailing backlog of work. The trend of inflow of soil samples was found to be seasonal. The ABC demonstration results had proved the superiority of soil test recommendations over other two practices viz. general departmental recommendations and practices followed without fertilizer use.

III

Use of Soil Testing Service at Farm Level

Characteristics : The available primary data suggested that the beneficiary households enjoyed better socio-economic status as compared to non-beneficiary households.

Coverage under Extension Service : Consultation of the extension workers was appreciable for both groups of households. This was particularly due to the Benor scheme.

Awareness : The awareness about existence of soil testing laboratory in the district was higher among beneficiary households than non-beneficiary households. However, the awareness about getting the soil tested directly by paying fees was poor among both groups of households.

The Reason for Non-adoption : The reasons given for non-adoption of soil testing in order of importance were as follows : (i) ignorence about soil testing facility (50%), (ii) no major problem (20%, (iii) soil was tested prior to reference period (17.5%, (iv) non-availability of VLW's service (7.5%), and (v) apathy towards soil testing service (5%).

Details about Soil Samples :

Crops covered : The following three crops viz. American cotton, wheat and gram were covered under soil testing. Majority of the households had sent soil samples for one crop only.

Seasons covered : A majority of the beneficiary households (56) had sent soil samples for one season only. This is somewhat surprising for an area with better irrigation facility.

Recurrence of soil samples : About 40 per cent of beneficiary households were not new to this service, i.e. 24 beneficiary households had adopted soil testing prior to the reference period which indicates their faith and interest in soil testing service.

Fertilizer use level : On none of the soil tested plots fertilizers in terms of nutrients NPK were applied as per the recommendation of soil testing laboratory.

Fertilizer use level and yield level : The superiority in terms of per hectare yield (kgs./hect.) of soil tested plots over non-tested soil plots either of beneficiary or non-beneficiary farms was proved only in the case of wheat. Such superiority was not established in the case of American cotton and gram. The yield rates were found to be higher on the farms using less than the recommended doses of soil testing laboratory for nutrients NP and NPK as compared to those using higher doses.

Method of soil sample collection : A majority of the soil samples taken were found satisfactory with respect to average area covered per soil sample, the number of spots represented per soil sample, the quantity of soil collected per soil sample, the depth of layer of soil sample and instrument used for collecting the soil sample.

Attitude/Opinion : It is heartening to note that majority of the sample beneficiary households reported satisfaction with the service. The main source of awareness for soil testing service was VLW followed by other farmers and ABC demonstration plots. No beneficiary had reported his ignorence about soil sample collection. Only three households had reported that the soil test results were not communicated to them. The remaining households reported that these results were not conveyed in time. The services of VLW to explain the results of the soil test were not available to majority of the households. Some beneficiaries were not happy with the present position of the SSTL in terms of soil testing facility for the micro-nutrient test.

Specific Suggestions :

1. The co-ordination between extension staff and laboratory staff at State level as well at laboratory level needs to be improved.

2. With a view to launch intensive follow-up work of soil test recommendations, the laboratory should be strengthened by providing extension cell.

3. The replacement of old equipments should be considered at the end of every five years.

4. Provision of two diesel-based vehicles instead of one petrol vehicle should be considered to facilitate intensive follow-up work of soil test recommendations in addition to routine work.

5. To avoid the problems which arise in the absence of electricity, a provision of generator for the laboratory should also be made.

6. Facility for micro-nutrient tests like Zn, Fe and Borone should be provided in the laboratory with a view to satisfy the demand from farmers for crops like sugarcane, sugarbit, wheat and fodder.

7. The amount granted per sample was found to be static in relation to rising cost of material almost every year. The amount given per soil sample to be tested should be increased keeping in view the price rise.

8. At present about 71 per cent of the tehsils lie at a distance of more than 100 kms. from the soil testing laboratories. Secondly, inflow of

soil samples was also found to be seasonal. New laboratories may be opened keeping in view the above factors.

9. In order to increase the coverage of soil testing service, the soil sample test should be made compulsory for demonstration plots, crop cutting harvest competetion and hybrid seed production plots etc.

10. Facility of mobile van should be provided in villages once in a season prior to sowing and soil test results should be explained to farmers on the site.

11. The ABC demonstration plots and documentary films for soil testing service should be arranged in the villages for the propogation of the soil testing service.

12. Arrangement may be made to send soil test reports directly to cultivators and this report should also be self-explanatory.

13. A token charge may be levied for soil sample test. This would reduce the financial strengency faced by the laboratory.

14. The follow-up work of soil test recommendations should be intensively launched by the laboratory staff itself.

C H A P T E R : I

I N T R O D U C T I O N

Fertilizer use without first testing the soil is like taking medicine without first consulting a physician to find out what is needed. In the absence of fertilizer recommendation based upon soil test, a farmer may be providing either too much or too little of neutrients required by plants. This not only means an uneconomical use of fertilizers, but in some cases crop yields may be actually reduced because of the wrong kinds or amounts of fertilizers. Thus, soil testing helps in balanced and appropriate application of fertilizer.

The success of this service depends on how scientifically the soil samples have been collected. Several factors such as instrument used, depth of the soil collected, number of spots for soil collection are important for the efficacy of this service. Apart from scientific soil testing, optimum fertilizer application depends upon several other factors as follows : Whether the reports of soil sample reach the farmers ? If they reach to farmers, whether the farmers understand them ? Again, whether the farmers adopt the fertilizer recommendations fully or not ?

The soil testing services have been in operation in different parts of the country for over two decades. There are about 274 soil testing laboratories in the country with a total capacity of analysing about 40

million soil samples annually. The major problems posed before this service are : lack of follow up of recommendations by farmers in some areas, underutilization of installed capacity of laboratories and adoption of lower doses of fertilizers than recommended on the basis of soil test. This study has been undertaken to study to understand the operational and/or socio-economic reasons for the existance of such problems.

Objectives

This study has been undertaken with the following objectives :

1. Study the organizational set up of soil testing laboratories in the State with a view to identify problems involved in their effective functioning and suggest measures for improvement.

2. Study the working of soil testing laboratories in terms of number of soil samples tested, seasonal arrival and despatch of soil samples and crop-wise soil samples tested.

3. Study the extent of adoption of recommendation made by soil testing laboratories.

4. Identify the factors associated with non-adoption of recommendations.

Coverage and Methodology

The present study has been divided into three chapters. The objectives and methodology of this study have been discussed in Chapter I. A detailed study of

the soil testing service in Rajasthan has been carried out in the second chapter. Such a detailed study is based on the soil testing laboratory located at Sriganganagar. It has been selected purposively because this soil testing laboratory has been in operation since 1968. Its performance was also reported to be relatively better as compared to other laboratories. Finally, it was also reported that the follow up work in the area covered by this laboratory was relatively better.

The third chapter is based on the micro level study to assess the impact of soil testing service used by farmers. The sample survey was undertaken in Sriganganagar district which is under the jurisdiction STL* located at Sriganganagar. The selection of Sriganganagar district was purposive because majority of the soil samples received at the SSTL were from this district during the reference period 1979-80. Within Sriganganagar district, the tehsil which had sent the largest number of soil samples to the laboratory was selected and accordingly Sriganganagar tehsil was selected. The same procedure was adopted for selection of villages also. Villages with large number of soil samples and better participation of farmers during 1979-80 were selected. While collecting the data regarding village-wise soil samples sent to SSTL, it was found that as against the total number of soil samples the participation ratio of the farmers was little less than one-third. Hence it was decided to select those villages from where atleast 10 farmers had participated.

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* Under Sriganganagar Soil Testing Laboratory (SSTL) in the beginning the following districts, viz., (i) Sriganganagar, (ii) Bikaner, (iii) Churu, (iv) Sikar were covered and during the reference period only Sriganganagar and Bikaner districts were under its juridication.

Such villages were arranged in ascending order and first six villages were finally selected. Sixty beneficiary households (those whose soil samples were recorded at SSTL) were selected randomly by proportional allocation to total number of beneficiaries in these six villages. In order to select 40 non-beneficiary households from these 6 villages, the allocation ratio or weightage ratio worked out in the case of beneficiary households in a village was adopted and accordingly the non-beneficiary households from each village were selected randomly. Thus, in all 40 non-beneficiaries from these 6 villages were selected randomly by proportional allocation method.

Schedules

1. Household Schedule : The household schedule for beneficiaries covered aspects such as adoption of soil testing service by farmers, their attitude and behaviour towards the service, accessibility and use of extension service by farmers. The schedule for non-beneficiary households covered factors affecting non-adoption of soil testing service. Moreover, for both types of households, data on socio-economic characteristics and cultivation practices have been collected.

2. Schedule for STL : Under this schedule, information on the number of soil samples tested during 1975 to 1979, their classification according to month-wise arrival and despatch of soil samples and crop-wise soil sample tested during the same period have been covered. Moreover, contigent expenditure for carrying out tests for soil samples as well number of tehsils covered under each laboratory have been covered.

Reference Period

Working of SSTL has been reviewed on the basis of five year data from 1975 to 1979. The reference period for the farm level data is the agricultural year 1979-80, i.e. from June 1979 to May 1980.

Method of Data Collection

The beneficiary households were assessed on the basis of a list provided from SSTL for the year 1979-80 for the selected six villages and the data from beneficiary and non-beneficiary households were collected during the course of one round of field survey conducted during April-May 1981 for the reference period 1979-80. The data for various STL in the State were collected with the help of schedules devised for STL. These data were collected by holding personal interview with the concerned officials.

CHAPTER : II

SOIL TESTING SERVICE IN RAJASTHAN

The following aspects have been discussed in this chapter : (i) working of soil testing service in Rajasthan, (ii) working of Sriganganagar soil testing laboratory particularly with reference to Sriganganagar district and tehsil.

I

Working of Soil Testing Service in Rajasthan

State Level Organization : At State level the Jt. Director, Agriculture (Soil Survey) is in-charge of this unit. He is assisted by Dy. Director, Agriculture (Quality Control & Soil Survey) who has been provided with the required staff for this cell. The Dy. Director, Agriculture looks after the working of various soil testing laboratories (Stationery) and mobile testing van in the State. There are 4 soil testing laboratories situated in different parts of the State and one mobile van which lies at Jaipur and covers almost the entire State. The details of location and area of juridication of different soil testing laboratories in the State has been provided in Table II.1. In the initial years (1958 to 1960) the facility of soil testing service in the State was started with the aid of Government of India. Hence, the first soil testing laboratory (STL) was established at Jodhpur in 1958 and thereafter subsequent STLs at Jaipur, Kota and Sriganganagar were established in 1968-69.

Working of the Different Laboratories in the State : Table II.2 provides information pertaining to annual soil testing capacity and actual soil samples tested by the four laboratories during 1960-61 to 1979-80. This table shows that soil testing service has made considerable progress starting from 5000 samples to be tested per annum in 1960-61 to 90,000 per annum. The actual number of soil samples tested has increased from 7569 in 1960-61 to 80545 in 1979-80. However, since 1975-76 onwards the actual achievement is below the target in the State.

Laboratory-wise Working during the last 5 years (1975-76 to 1979-80) : Table II.3 provides data about the installed capacity and actual utilization at each laboratory during 1975-79. The best performance is shown by the Durgapur soil testing laboratory with 108 per cent capacity utilization during the five year period. The capacity utilization was the lowest in case of Sriganganagar soil testing laboratory (71 per cent). The capacity utilization for all laboratories put together was about 88 per cent for the five year period.

Co-ordination : The success of this programme largely depends on the co-operation of the extension staff with the STL in collecting the soil samples scientifically from farmers field and thereafter in explaining the soil testing recommendations to the farmers. At all levels, i.e. at State level as well as at laboratory level it was found that co-ordination between these two agencies was rather poor.

The Need for Raising Soil Testing Capacity : Table II.2 shows that the soil testing service has got momentum in the State during last five years. This service could get

further momentum by reducing the area of juridication for each laboratory. Data provided in Table II.4 reveals that about 71 per cent of the total number of tehsils served by all the laboratories lie at a distance of more than 100 kms. Secondly, as a result of longer distance of tehsils from STL, the bulk of the soil samples are from nearby tehsil or district (see Table II.7). Hence, larger number of farmers can be covered under this service by establishing either more of stationery STL or mobile van.

The Need to have Extension Cell with STL : Though the progress with respect to soil samples to be tested has been satisfactory, its qualitative impact remains unexplored. Are the soil samples collected scientifically ? Whether the farmers follow the recommendations or not ? What benefits are achieved by those who follow the recommendations ? Why some farmers are not following the recommendations ? These questions remain unexplored. No provision for this has been made either at the State level or at laboratory level to look into the follow-up work of soil testing.

The State level officials feel that each laboratory should be strengthened by providing a small extension cell to look after the follow up work. Thus, the laboratory staff would be in direct contact with the farmer community.

II

Working of Sriganganagar Soil Testing Laboratory (SSTL)

Significance of SSTL : During the last five years this laboratory has analysed about 70,000 soil samples. These samples revealed that nutrient K, i.e. potash is now declining in Sriganganagar district soil year after year

(for details see Table II.5). Before five years its percentage was high. It has been reduced to medium level and it may decline further to lower level. Thus, there is a need to apply nutrient K along with other nutrients required for the crop. Even the research farm results has also indicated that if 4 kgs./hect. of nutrient K is applied, the yield of wheat can increase by about 1 to 2 quintals per hectare. This laboratory has made a useful contribution in this district by indicating the need of nutrient K in the soil. The farmers are advised to use required level of potash for the crop (as per recommendation of SSTL) so that plants can be saved from pest and diseases.

Working of Sriganganagar Soil Testing Laboratory(SSTL)

Administrative Set-up and Coverage : The soil testing laboratory at Sriganganagar was established in 1968-69. Its area of operation since the beginning included Sriganganagar, Churu, Bikaner and Jhunjunu districts. In the recent years (1979-80 and 1980-81) the Churu, Sikar and Jhunjunu have been attached with 'Durgapura' laboratory. Water test has also been carried out in this soil testing laboratory.

The annual capacity of testing the soil sample in the year 1979-80 was 20,000 and the per day maximum capacity is 100.

Staffing Pattern : Assistant Agricultural Chemist is in-charge of this soil testing laboratory. He is assisted by one research assistant, one junior soil analyst and three laboratory assistants in addition to required administrative staff for the laboratory. The details can be seen in Table II.6.

Suitable changes in the staff pattern may be required to take up follow up work of soil test recommendations for the beneficiary farmers and also to impart training to panchayat level and village level staff regarding the scientific method of soil sample collection as well for explaining the recommendation of soil tests after converting suggested N, P, K to a particular brand of fertilizer:

i) The post of Assistant Chemist Soil Test (Class I) should be considered for up-gradation as Dy. Director for soil testing and this post be suitably strengthened by providing the assistance of three Assistant Soil Officers (Chemistry). Of the three Assistant Soil Officers, one will be in-charge of technical or analytical work in the laboratory, while other two will look after follow-up work for recommendation to beneficiary farmers.

ii) Two laboratory assistants attached to each Assistant Soil Testing Officer should be provided as supporting extension staff for the collection of soil samples.

iii) At panchayat samiti level Assistant Agriculture Research Officer should be posted who will guide the extension staff for collecting the soil sample scientifically.

Equipment : For the analysis of micro-nutrient like Zn, Fe and Borone facility in terms of implements, machinery and chemical required should be provided in the laboratory. This is essential particularly because the crop pattern of the district has undergone significant change. Crops like wheat, sugarcane and sugarbit would require above-mentioned tests which are at present not carried out in the laboratory.

Secondly, facility of generator would help to operate the machinery in the absence of electric power. Moreover, it is necessary to replace old implements at the end of every five years.

Vehicle :

At present one petrol jeep has been provided. With the given budget for petrol, the mobility of the staff for ABC trials, fertility surveys and for follow-up work is restricted. Therefore, there is a need to provide atleast two diesel vehicles to the laboratory instead of one petrol vehicle. As a result the operating cost may increase marginally, but it would enable the laboratory to undertake its work relating to the ABC trials, fertility survey and follow up work more vigorously.

Performance of SSTL

The performance of SSTL during 1975 to 1979 with respect to number of soil sample tested, the crop-wise soil sample tested, monthly arrival and despatch of soil samples may be examined. In addition to this the details of ABC plots conducted in 1979-80 has also been discussed. The above analysis has been carried out with reference to : (i) performance of SSTL as a whole, (ii) Sriganganagar district and Sriganganagar tehsil.

Soil Samples Tested

In Table II.7 information pertaining to soil sample tested at SSTL and its break up for Sriganganagar district and for same tehsil has been provided. This information is for the period 1975 to 1979.

The table shows that except 1977 and 1979 in all other three years the soil samples tested were below the set target (15,000). Secondly, of the soil samples tested some soil samples are directly collected by laboratory staff to prepare soil fertility map. Their share was in the range of 34 to 54 per cent, while share of samples from BDO was in the range of 46 to 64 per cent. But excepting 1978, year after year the extent of soil samples sent through BDo in the total soil sample is decreasing. This is particularly due to weak coordination between laboratory staff and BDO's staff. This can be improved by establishing better coordination between these two agencies.

The table shows that excepting 1977 (40%) and 1979 (49%) the share of Sriganganagar district in the total samples tested was around 60 per cent, whereas the share of Sriganganagar tehsil varied in the range of 14.6 per cent in 1977 to 43.9 per cent in 1978. Thus, the share claimed by Sriganganagar district as well by Sriganganagar tehsil was highest as compared to other districts and tehsils which fall under the juridication of this laboratory. This is partly due to nearness of SSTL. It is also due to the fact that this district and tehsil are progressive in cultivation and they have a sound irrigation base which induced them to use more of fertilizers* as compared to other districts and tehsils.

Crop-wise Soil Samples

The crop-wise details of soil samples tested has been furnished in Table II.8. The table shows that by and large (excepting 1976 and 1977) the highest number of soil samples tested were carried

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* For fertilizer use see Table II.9.

out for cotton followed by wheat. Other crops did not reveal any trend. However, they included, in order of numerical importance, sugarbit, sugarcane and bajri. The number of soil samples for these crops has substantially declined from 1975 to 1979.

Arrival and Despatch of Soil Sample

Tables II.10 and II.11 provide month-wise information about arrival and despatch of soil samples in the SSTL during 1975 to 1979. The following conclusions are drawn from these tables :

The major share of the total number of soil samples arrived at laboratory during the months of March, April, May, September, October and November. The proportion of soil samples during these months varied from 71 per cent in 1978 to 92 per cent in 1979. The proportion of soil samples despatched from the laboratory during the above months (except June and September) varied from 79 per cent in 1976 to 90 per cent in 1979. The arrival and despatch of soil samples from the laboratory was generally concentrated during pre-kharif and pre-rabi periods. Between the two periods, the bulk of the arrival and despatch of soil samples from the laboratory was during pre-kharif period.

Table II.12 provides data on number of soil samples despatched from SSTL as against the arrival of soil samples in the laboratory during the same months.

This table shows that, except in July 1975, in all other years for the following months viz., May, June, July, August, November (except November, 1979) and December the number of soil samples despatched

was higher than for arrival. This was because the laboratory cleared of the work load of previous months. This indicates that results of soil testing were not despatched in time prior to sowing in kharif and rabi seasons. There is no justification for such delay because in no month laboratory staff had to exert more for testing the soil samples beyond its capacity (100 samples per day). Thus, there is considerable scope for minimising the period of delay in despatching the soil samples from laboratory.

ABC trials conducted in 1979-80

Table II.13 provides information pertaining to ABC demonstration trials conducted in 1979-80 in the State. The objective of the soil testing is to achieve balanced fertilizer use so as to obtain higher profit per hectare of cultivated land. This is clearly evidenced from the results cited in Table II.13 for net profit achieved : (i) without fertilizer use, (ii) as per departmental recommendation, and (iii) as per soil testing recommendations.

The trials were conducted for the following four crops : (1) wheat, (2) paddy, (3) jowar, and (4) cotton (Bikaneri nerma). In all the crops and in each variety of wheat the per hectare net profit was higher in case of practices based on soil test than on general departmental recommendation, in all varieties wheat (excepting Raj 921 wheat) and other crops. The difference in per hectare net profit was more attractive. It varied from Rs.195 per hectare in case of cotton (Bikaneri nerma) to Rs.708 for paddy. In the case of wheat (excepting wheat Raj 921) it varied from Rs.226 for Kalyansona (conducted at government farm bundi) to Rs.573 for the same variety

(but trial conducted at Kachadi Kota). Thus, the results of research conducted under these three different conditions proved that use of soil testing recommendation has a significant positive impact on net profit.

Cost per Soil Sample Tested

Table II.14 provides information regarding cost per soil sample tested with two different components viz. (i) variable cost, and (ii) total cost (variable + fixed). These data have been analysed separately for samples tested for cultivators and for laboratories and cultivators togather. If the sample collected by laboratory staff are not taken into account, the cost per soil sample sent through BDO and cultivators is higher. The expected normal cost per soil sample tested is arrived at by considering the soil samples collected by laboratory staff to prepare soil map of the district. Secondly, if both types of samples are considered togather, the amount granted from time to time is found to be inadequate looking to increase in the samples and also the price rise taking place year after year.

III

Problems of Soil Testing Service

Equipments :

Many equipments owned by the laboratory are quite old. Such equipments should be replaced considering 5 years as the average life for equipments in the laboratory.

Insufficient budget :

The present budget provision for this programme is inadequate. The budget per soil sample tested is more or less static as compared to increase in the price of materials and equipments required in the laboratory. Hence budget provision should be made keeping in view the increase in the price of materials and equipments required for the laboratory.

Seasonal inflow of samples :

The trend of inflow of samples is seasonal and, as a result, soil sample testing and despatch of recommendations before sowing season becomes difficult. The need for establishing additional laboratories and/or raising the capacity of existing laboratories should be examined keeping in view the seasonal workload.

Mobility problem :

Looking to wide juridication of the laboratory, and the need for supervision of follow up work of soil test recommendation, provision of only one jeep is insufficient. There should be atleast two jeeps, one can be used at the headquarter for supervision, while second can be utilized for follow up work such as demonstration plots and to attend cluster meetings in different villages. Mobile testing van should also be provided in the potential district. This arrangement would help to cover large area in a stipulated time.

Problem of targets :

The achievement of targets depends on two agencies, viz., (i) the extension staff who send soil samples to the laboratory, and (ii) laboratory staff

who test the soil samples and make recommendations. It was reported that whatever soil samples were received from extension staff were sent to cultivators after making necessary test and recommendation. Therefore, any lag in achieving targets is due to the extension staff who send inadequate number of samples to the laboratory as against set target. The efficiency of the laboratory should be considered on the basis of number of soil samples received from extension staff and the number of samples tested.

Communication of results to cultivators :

At present the reports of soil samples tested are sent directly to concerned VLW through BDO. Thereafter VLW is supposed to explain the results and recommendations to the farmers concerned. However, field investigation carried out for this study revealed that this arrangement has not worked satisfactorily. It is, therefore, suggested that the soil sample reports should be sent directly to cultivators. This would involve considerable postal expenditure. If the postal authorities provide concession for this useful social service, this work is likely to be facilitated. If it is decided to send the reports directly, the form of the report should be simplified so that farmers can easily understand them.

Extension of laboratory :

Looking to the change in crop pattern with the introduction of new crops like sugarcane, sugarbit and also other crops such as wheat and fodder, the micro-nutrient test like Zn, Fe and Boron are required respectively. Laboratory facility for such micro-nutrient test should be created.

Problem of co-ordination :

Lack of co-ordination is reported between laboratory staff and extension staff. Better co-ordination between these two agencies should help in improving coverage of soil testing. Its qualitative effect on the agricultural economy is also likely to be significant.

Electricity problem :

Absence of electricity disturbs the work of soil sample test in the laboratory. An electric generator should be provided to overcome this difficulty.

Problem of staff :

The present staff is not inadequate. However, effective soil testing service needs thorough follow up work and for this a small "extension cell" should be attached to laboratory.

Suggestion about popularity to ST service :

To make soil testing service more popular and effective the soil sample test should be made compulsory for those farmers who participate in demonstration plots, crop cutting harvest competetion, hybrid seed production plots programme etc.

Table: II.1

Area of Juridication of different Soil Testing Laboratories in Rajasthan.

Sr. No.	Laboratories located at	Area of juridication		During 1979-80	
		District	Tehsils	No. of Tehsils covered	Distant village served (in kms.)
1	Jaipur	5 (19.2)	52 (26.5)	22 (17.4)	200
2	Jodhpur	11 (42.4)	72 (36.7)	54 (42.9)	550
3	Kota	5 (19.2)	39 (19.9)	38 (30.2)	235
4	Sriganganagar	5 (19.2)	33 (16.9)	12 (9.5)	200
5	Total	26 (100.0)	196 (100.0)	126 (100.0)	-

Source: Office of the Dy.Director (Quality Control & Soil Survey) Agriculture, Jaipur.

Note: Figures in brackets indicate percentage to total.

Table II.2

Working of Soil Testing Laboratories in Rajasthan during 1960-79.

Sr. No.	Year	No. of Laboratories	Annual capacity		No. of soil test done		No. of water test done	
			Sample No.	Index No. 1960-61=110	Sample No.	Index No. 1960-61=100	Sample No.	Index No. 1960-61=100
1	1960-61	1	5000	100	7569	100	431	100
2	1961-62	1	5000	100	8233	109	520	120
3	1962-63	1	5000	100	9100	120	345	80
4	1963-64	1	5000	100	9703	128	466	108
5	1964-65	1	10000	200	13710	181	500	116
6	1965-66	1	10000	200	14012	185	302	70
7	1966-67	1	10000	200	16268	215	405	94
8	1967-68	1	10000	200	16873	223	305	71
9	1968-69	4	25000	500	25955	343	1219	283
10	1969-70	4	30000	600	31594	417	1275	296
11	1970-71	4	50000	1000	57281	757	1503	349
12	1971-72	5	60000	1200	67631	894	1405	326
13	1972-73	5	70000	1400	70218	928	1315	305
14	1973-74	5	70000	1400	70810	936	1205	280
15	1974-75	5	70000	1400	71105	939	1353	314
16	1975-76	5	90000	1800	72753	961	1445	335
17	1976-77	5	90000	1800	80889	1069	1399	325
18	1977-78	5	90000	1800	83642	1105	1406	326
19	1978-79	5	90000	1800	75878	1002	690	160
20	1979-80	5	90000	1800	80545	1064	1788	415

Source: Office of the Dy.Director (Quality Control & Soil Survey), Agriculture, Jaipur.

Table: II.3

Year-wise Capacity-Targets and Achmevement in different Laboratory

Sr. No.	Name of the laboratory	Fixed targets	Year					Efficacy during last 5 years (in %)
			1975-76	1976-77	1977-78	1978-79	1979-80	
1	2	3	4	5	6	7	8	9
1	STL Durgapura (Jaipur)	20000	21788 (108.94)	21433 (107.16)	22549 (112.75)	22458 (112.29)	19640 (.98.20)	108
2	Mobilevan, Durgapura (Jaipur)	10000	8240 (82.40)	10850 (108.50)	8036 (80.36)	6603 (66.03)	9258 (92.58)	86
3	STL Jodhpur	20000	17278 (86.39)	20144 (100.72)	21631 (108.16)	18248 (91.24)	17660 (88.30)	90
4	STL Kota,	20000	11222 (56.11)	15210 (76.05)	15471 (77.36)	16905 (84.53)	17795 (88.98)	77
5	STL Sri-ganganagar	20000	14225 (71.12)	13252 (66.26)	15955 (79.78)	11664 (58.22)	16192 (80.96)	71
6	Total	90000	72753 (80.83)	80889 (89.88)	83642 (91.82)	75878 (84.31)	90545 (89.49)	88

Source: Office of the Dy.Director (Qyality Control & Soil Survey) Agriculture, Jaipur.

Note: Figures in brackets in columns (4), (5), (6), (7) and (8) are the percentages with respect to column (3).

Table: II.4.
Frequency Distribution of Tehsils Covered (in 1979-80) according to Distance from STL.

Sr. No.	Distance (Kms.)	Laboratories located at				Total
		Jaipur	Jodhpur	Kota	Sriganganagar	
1	Upto 20 kms.	4 (18.0)	1 (1.9)	2 (5.3)	1 (8.3)	8 (6.3)
2	21 to 50	1 (4.6)	1 (1.9)	2 (5.3)	3 (25.0)	7 (5.6)
3	51 to 100	3 (13.7)	6 (11.1)	9 (23.6)	3 (25.0)	21 (16.7)
4	101 to 200	14 (63.7)	21 (38.8)	21 (55.2)	2 (16.7)	58 (46.0)
5	201 & above	-	25 (46.3)	4 (10.6)	3 (25.0)	32 (25.4)
6	Overall	22 (100.0)	54 (100.0)	38 (100.0)	12 (100.0)	126 (100.0)

Note: Figures in brackets indicate percentage to total.

Source: Respective Soil Testing Laboratory.

Table: II.5

The Extent of Nutrient-K in the Soil in different Panchayat Samiti in Shrganganagar District.

Sr.No.	Panchayat Samiti	Years								
		1974-75			1975-75			1976-77		
		L	M	H	L	M	H	L	M	H
1	2	3	4	5	6	7	8	9	10	11
1.	Sriganganagar	-	-	100	-	-	100	.2	3.7	96.1
2.	Hanumangadh	-	-	100	-	-	100	-	1.1	98.9
3.	Sri Karanpur	-	-	100	-	-	100	-	.2	99.8
4.	Padampur	-	2.1	97.9	-	-	100	-	-	100
5.	Raisinghnagar	-	0.2	99.8	-	3.5	96.5	-	2.0	98.0
6.	Sadulshahar	-	-	100	-	-	100	-	-	100
7.	Nauhar	-	-	100	-	-	100	-	-	100
8.	Mandara	.3	1.5	98.2	-	-	100	-	-	100
9.	Suratgadh	-	-	100	.4	1.4	98.2	1.5		98.5

Contd....

Table: II.5 Contd...

Sr. No.	Panchayat Samiti	1977-78			1978-79			Average
		L	M	H	L	M	H	
1.	Sriganganagar	0.4	24.4	75.2	0.2	25.2	74.6	16.00
2.	Hanumangadh	0.1	2.9	77.1	0.5	13.6	86.1	8.60
3.	Sri Karanpur	0.1	21.1	78.8	0.4	10.5	89.0	3.90
4.	Padampur	-	2.7	97.3	-	6.4	83.6	1.80
5.	Raisinghnagar	-	8.3	91.7	2.1	27.3	70.6	4.80
6.	Sadulshahar	-	37.8	62.2	-	2.0	98.0	8.90
7.	Nauhar	-	32.7	67.3	-	-	100	7.40
8.	Mandara	-	9.3	90.7	-	-	-	1.90
9.	Suratgadh	-	28.3	71.7	-	7.8	92.0	15.20

L = Low, M = Medium, H = High.

Source: Soil Testing Laboratory, Sriganganagar, Rajasthan.

Table II.6

Details about Staff Pattern of Sringanagar STL.

Staffing Pattern in the year 1980.

Sr.No.	Designation of the Post.	No.
1	Asstt. Agricultural Chemist	1
2	Research Assistant	1
3	Junior Soil Analyst	1
4	Upper Division Clerk	1
5	Lower Division Clerk	1
6	Lab. Assistant	3
7	Driver	1
8	Class IV	4

Table : II.7

Details about No. of Soil Sample Tested during 1957 to 1979 at Shriganganagar STL.

Location	Year 1975	1976	1977	1978	1979
1.Sriganga-nagar Tehsil :	3759 (26.43)	2897 (21.86)	2334 (14.63)	5122 (43.91)	3540 (21.86)
2.Sriganga-nagar district :	9107 (64.02)	7730 (58.33)	6475 (40.58)	7317 (62.73)	7399 (45.69)
3.Sriganga-nagar Labora-tory A:	9153 (64.34)	7730 (58.33)	7962 (49.90)	7627 (65.39)	7492 (46.27)
B:	5072 (35.66)	5522 (41.67)	7993 (50.10)	4037 (34.61)	8700 (53.73)
Total:	14225	13252	15955	11664	16192
	100.00	100.00	100.00	100.00	100.00

Source: Soil Testing Laboratory, Sriganganagar, Rajasthan.

Note: Figures in brackets indicate percentage to total soil samples of Sringanagar Soil Testing Laboratory.

A = No. of soil samples which were sent through B.D.O. and farmers.

B = No.of soil samples which were collected by ST Laboratory itself to prepare soil map.

Table II.8

Crop- wise Soil Samples Tested during 1975 to 1979 at Sriganganagar Soil Testing Laboratory.

Sr. No.	Name of the Crop.	Year 1975	1976	1977	1978	1979
1.	Sugarcane	744 (8.13)	163 (2.11)	311 (4.01)	1615 (21.17)	358 (4.75)
2.	Cotton	4506 (49.23)	3293 (42.60)	2920 (37.63)	3947 (51.75)	3884 (51.50)
3.	Bajra	519 (5.67)	539 (6.97)	956 (12.31)	445 (5.83)	194 (2.57)
4.	Sugarbit	1408 (15.38)	122 (1.58)	560 (7.22)	190 (2.49)	175 (2.32)
5.	Wheat	1952 (21.33)	3613 (46.74)	3013 (38.83)	1415 (18.56)	2920 (38.73)
6.	Paddy	24 (0.26)	-	-	15 (0.20)	10 (0.13)
7.	Total	9153 (100.00)	7730 (100.00)	7760 (100.00)	7627 (100.00)	7541 (100.00)

Source: Soil Testing Laboratory, Sriganganagar, Rajasthan.

Note: Figures in brackets indicate percentage to total.

Table II.9

Distribution of Fertilizer in Sriganganagar District.

Sr. No.	Year	Gross cropped area (Heet.)	Use of Fertilizer nutrient					
			N		P		K	
			M.Ton	kgs/Hect.	M.Ton	Kgs/Hect.	M.Ton	Kgs/Hect.
1	1971-72	-	12702	-	835	-	524	-
2	1972-73	1701824	14387	8.45	1947	1.14	629	0.37
3	1973-74	1819153	12858	7.07	2015	1.11	525	0.29
4	1974-75	1400930	13099	9.35	1082	0.77	417	0.30
5	1975-76	1497943	23097	15.42	1789	1.19	474	0.32
6	1976-77	1623871	26607	16.38	3604	2.22	1006	0.62
7	1977-78	1363429	32848	24.10	4455	3.27	1138	0.83
8	1978-79	1716810	37869	22.06	4527	2.64	1220	0.71
9	1979-80	1655767	39283	23.72	6932	4.19	1276	0.77

Source: District Statistical Abstract, Sriganagar District, pp. 97.

Table II.10

Monthwise Arrival of Soil Samples during 1975 to 1979 at Sriganganagar Soil Testing Laboratory

Sr. No.	Month	Year									
		1975		1976		1977		1978		1979	
		No.	%	No.	%	No.	%	No.	%	No.	%
1.	January	138	1.51	5	0.06	11	0.14	190	2.49	99	1.32
2.	February	261	2.85	-	-	-	-	1402	18.38	106	1.41
3.	March	612	6.68	565	7.31	1026	12.89	712	9.33	697	9.30
4.	April	1734	18.95	1113	14.40	1557	19.56	1847	24.22	1673	22.33
5.	May	2254	24.63	1753	22.68	658	8.26	1307	17.13	1582	21.12
6.	June	111	1.21	161	2.08	687	8.62	265	3.47	227	3.03
7.	July	548	5.99	360	4.66	1034	12.99	295	3.87	60	0.80
8.	August	63	0.69	36	0.47	75	0.94	51	0.67	27	0.36
9.	September	628	6.86	211	2.73	-	-	168	2.20	298	3.98
10.	October	1939	21.18	1695	21.93	1363	17.12	1111	14.58	1183	15.80
11.	November	787	8.60	1493	19.31	1413	17.75	256	3.36	1459	19.47
12.	December	78	0.85	338	4.37	138	1.73	23	0.30	81	1.08
13.	Total	9153	100.00	7730	100.00	7962	100.00	7627	100.00	7492	100.00

Source: Soil Testing Laboratory, Sriganganagar, Rajasthan

Table-IV.11

Month-wise Despatch of Soil Samples during 1975 to 1979 at Sriganganagar Soil Testing Laboratory

Sr. No.	Month	Year									
		1975		1976		1977		1978		1979	
		No.	%	No.	%	No.	%	No.	%	No.	%
1.	January	138	1.51	5	0.06	11	0.14	182	2.39	99	1.32
2.	February	170	1.86	-	-	-	-	16	0.21	5	0.07
3.	March	486	5.31	455	5.89	140	1.76	1922	25.20	456	6.09
4.	April	886	9.68	578	7.48	1257	15.79	1150	15.08	1648	22.00
5.	May	2770	30.26	2045	26.45	1500	18.84	1940	25.44	1564	20.88
6.	June	660	7.21	442	5.72	745	9.36	357	4.68	604	8.05
7.	July	328	3.58	390	5.05	1118	14.04	355	4.65	65	0.87
8.	August	268	2.93	78	1.01	238	2.99	104	1.36	29	0.39
9.	September	488	5.33	21	0.27	-	-	76	1.00	191	2.55
10.	October	1101	12.03	1215	15.71	559	7.01	687	9.01	1002	13.36
11.	November	1642	17.94	1375	17.79	1988	24.97	747	9.79	1385	18.49
12.	December	216	2.36	1126	14.57	406	5.10	91	1.19	444	5.93
13.	Total	9153	100.00	7730	100.00	7962	100.00	7627	100.00	7492	100.00

Source: Soil Testing Laboratory, Sriganganagar, Rajasthan.

Table II.12

Monthwise Percentage of Soil Samples Despatched as Against the No. of soil Samples Arrived during 1975 to 1979 at Sriganganagar Soil Testing Laboratory.

Sr. No.	Month	Year 1975			1976			1977		
		A	B	C	A	B	C	A	B	C
1	2	3	4	5	6	7	8	9	10	11
1.	January	138	138	100.00	5	5	100.00	11	11	100.00
2.	February	261	170	65.13	-	-	-	-	-	-
3.	March	612	486	79.41	565	455	80.53	1026	140	13.65
4.	April	1734	886	51.10	1113	578	51.93	1557	1257	80.73
5.	May	2254	2770	122.89	1763	2045	116.66	658	1500	227.96
6.	June	111	660	594.59	161	442	274.53	687	745	108.44
7.	July	548	328	59.85	360	390	108.33	1034	1118	108.12
8.	August	63	268	425.39	36	78	216.66	75	238	317.33
9.	September	628	488	77.71	211	21	100.00	-	-	-
10.	October	1939	1101	56.78	1695	1215	71.68	1363	559	41.01
11.	November	787	1642	208.64	1493	1375	92.10	1413	1988	140.69
12	December	78	216	276.69	338	1126	333.13	138	406	294.20
13.	Total	9159	9153	100.00	7730	7730	100.00	7962	7962	100.00

Contd....

Table II.12 Contd...

Sr. No.	Month	1978			1979		
		A	B	C	A	B	C
		12	13	14	15	16	17
1.	January	190	182	95.79	99	99	100.00
2.	February	1402	16	1.14	106	5	4.72
3.	March	712	1922	269.94	697	456	65.42
4.	April	1847	1150	62.26	1673	1648	98.51
5.	May	1307	1940	148.43	1582	1564	98.86
6.	June	265	357	134.72	227	604	266.07
7.	July	295	355	120.34	60	65	108.33
8.	August	51	104	203.92	27	29	107.41
9.	September	168	76	45.24	298	191	64.09
10.	October	1111	687	61.84	1183	1002	84.70
11.	November	256	747	291.80	1459	1385	94.93
12.	December	23	91	395.65	81	444	548.14
13.	Total	7627	7627	100.00	7492	7492	100.00

Source: Soil Testing Laboratory, Sriganganagar, Rajasthan.

Note: A = No. of soil samples arrived. B = No. of soil samples despatched,
C = B/A x 100

Table II.13
Data about A, B, C Demonstration Trials conducted during 1979-80 in Rajasthan.

Sr. No.	Name of the Crop	Trial No.	Location at	Treatment	Yield Qtl./Hect.	Cost of fertilisers Rs./Ha	Yield of grain Rs/Ha.
1	2	3	4	5	6	7	8
1.	Wheat (Kalyan Sona)	1	Rambasera (Jhalawar)	A	10.50	-	1228.50
				B	21.00	466.70	2457.00
				C	23.20	445.18	2714.40
	Wheat (Kalyan Sona)	2	Kachari (Kota)	A	25.00	-	2925.00
				B	37.00	429.20	4329.00
				C	42.50	499.50	4972.00
	Wheat (Raj 921)	3	Govt. Farm. Kalyanpur -Jhalawar	A	5.10	-	596.70
				B	19.74	466.30	2309.50
				C	20.10	493.30	2351.70
	Wheat (Kalyan Sona)	4	Govt.Farm Chaterpura Bundi-	A	15.25	-	1784.25
				B	28.37	466.30	3319.30
				C	30.25	460.10	3539.25
2.	Paddy (Jaya)	1	Chaker-Khedi Kota	A	40.10	-	5112.50
				B	47.00	601.66	5875.00
				C	52.75	611.79	6593.75
3.	Jowar (CH5-5)	1	Govt.Farm Chaterpura -Bundi	A	8.12	-	1019.00
				B	20.62	409.29	2578.60
				C	25.00	419.59	3125.00
4.	Cotton (Bikaneri -nerma)	1	Sriganga-nagar	A	255.00	340.00	1275.00
				B	310.00	550.00	1550.00
				C	350.00	755.00	1950.00

Contd...

Table II.13 Contd...

Sr. No.	Name of the Crop.	Treatment	Net profit Rs./Ha.	Net Profit over control Rs./Ha.	Net Profit over GDR Rs./Ha	% change in profit over control	% change in profit over GDR
			9	10	11	12	13
1.	Wheat (Kalyan-Sona)	A	1228.50	-	-	-	-
		B	1990.30	761.80	-	62.01	-
		C	2269.22	1040.72	0278.92	84.71	14.01
	Wheat (Kalyan-Sona)	A	2925.00	-	-	-	-
		B	3899. 80	974.80	-	33.32	-
		C	4472.50	1547.50	572.70	52.91	14.69
	Wheat (Raj - 921)	A	596.70	-	-	-	-
		B	1843.20	1246.50	-	208.90	-
		C	1858.40	1261.70	15.20	211.45	0.82
	Wheat (Kalyan-Sona)	A	1784.25	-	-	-	-
		B	2853.00	1068.75	-	59.90	-
		C	3079.15	1294-90	226.15	72.57	7.93
2.	Paddy (Jaya)	A	5112.50	-	-	-	-
		B	5273.34	160.84	-	3.14	-
		C	5981.96	869.46	708.62	17.01	13.44
3.	Jowar (CHS-5)	A	1019.00	-	-	-	-
		B	2169.31	1150.31	-	112.89	-
		C	2705.41	1686.41	536.10	165.50	24.71
4.	Cotton (Bikaneri-nerma)	A*	935.00	-	-	-	-
		B	1000.00	65.00	-	6.95	-
		C	1195.00	260.00	195.00	27.81	19.50

Note: A = Without fertilisers, B = As per department's recommendation, C = As per soil test recommendation.

Source: Office of the Dy.Director (Quality Control & Soil Survey) Agriculture, Jaipur, Rajasthan.

*Only in case of cotton fertiliser used was reported as per traditional method.

Table II.14

Cost per Soil Sample Tested at Sriganganagar Soil Testing Laboratory.

(Unit in Rs.)

Sr. No.	Year	Cost per Soil Sample Tested			
		For samples which were sent from TDO's and from farmers directly.		For all sample together (Including Soil Sample Collected and tested by STL).	
		Variable cost	Aggregate cost	Variable cost	Aggregate cost
1.	1975-76	0.97	11.32	0.62	7.28
2.	1976-77	1.41	13.35	0.83	7.78
3.	1977-78	1.46	14.30	0.73	7.13
4.	1978-79	1.02	15.30	0.66	10.00
5.	1979-80	1.98	17.40	0.91	8.05

Source: Soil Testing Laboratory, Sriganganagar, Rajasthan.

CHAPTER : III

USE OF SOIL TESTING SERVICE BY FARMERS

This chapter covers the following aspects viz., (i) characteristics of the beneficiary and non-beneficiary households, (ii) utilisation of agriculture extension service and awareness about soil testing service among these households, and (iii) utilisation of soil testing service on beneficiary farms and its impact on crop cultivation. These three aspects have been discussed in three different sections.

I

Characteristics of the Beneficiary and Non-beneficiary Households (for Decision-maker) :

Table III.1 provides information for beneficiary and non-beneficiary households regarding characteristics such as membership of credit co-operative society, literacy level, experience of farming, caste composition and age-groups. The following conclusions may be noted from this table :

Membership of Credit Co-operative Society : About 82 per cent of the beneficiary households were members of credit co-operatives as compared to only 55 per cent of non-beneficiary households. Thus, the membership ratio was higher among beneficiary households than among non-beneficiary households.

Education : The literacy ratio was also better among beneficiary households (85 per cent) than among non-beneficiary households (72 per cent).

Experience of Farming : No marked variation has been found regarding experience of farming between two categories of households. The proportion of respondants with experience of farming for 16 years and above was higher among beneficiary households (64 per cent) than among non-beneficiary households (57 per cent).

Caste Composition : A vast majority of the beneficiary (85 per cent) and non-beneficiary households (90 per cent) belonged to Sikh community. Jat claimed 13 per cent of the beneficiary households and 10 per cent of the non-beneficiary households.

Age-group : The ratio in the productive age-group, i.e. in the age group of 15 to 59 years, was higher among beneficiary households (88 per cent) than among non-beneficiary households (72 per cent), whereas the corresponding figure for the age group 60 years and above was 12 and 18 per cent for beneficiary and non-beneficiary households respectively.

Land Use Pattern :

Information regarding land use pattern during 1979-80 among beneficiary and non-beneficiary households has been presented in Table III.2. The following conclusions may be noted from this table :

In each facet of land-use pattern the beneficiary households were in a considerably better position than non-beneficiary households. In the case of beneficiary households the average owned land, operational land and net cultivated land worked out to 7.20 hectares, 7.34 hectares and 6.05 hectares respectively,

whereas the corresponding figures for non-beneficiary households were 5.50 hectares, 5.50 hectares and 4.30 hectares respectively.

The per household gross cropped area, net irrigated area and gross irrigated area was also considerably higher among beneficiary households than among non-beneficiary households.

The cropping intensity and irrigation intensity in the case of beneficiary households were 132.64 per cent and 133.00 per cent respectively whereas the corresponding percentages for non-beneficiary households were 114.13 and 114.77 respectively.

Crop Pattern :

Data pertaining to crop pattern during 1979-80 for beneficiary and non-beneficiary households have been provided in Table III.3. The following conclusions have been drawn from this table :

The percentage of total area under cultivation during kharif and rabi seasons was the same for beneficiary and non-beneficiary households. Similarly, the proportion of irrigated area in the total area under cultivation was also more or less the same during respective seasons. No marked variations in the crop pattern of beneficiary and non-beneficiary households have been observed.

The average area under American cotton, deshi cotton, sugarcane, sugarbit, gram and wheat(crops with potential for using soil testing service)worked out to 6.81 hectares in the case of beneficiary households, the corresponding figure for non-beneficiary households being 4.10 hectares.

To sum up the beneficiary households enjoyed better position as compared to non-beneficiary households.

II

In this section, the coverage of sample households under different agricultural extension programme and how frequently they approached different extension workers for their agricultural problems have been discussed. Moreover, the extent of awareness about soil testing service among sample households has been examined. An attempt has also been made to find out as to why the non-beneficiary households did not adopt soil testing service during 1979-80.

a) Utilisation of Agriculture Extension Service :

Information regarding coverage of sample households under different items of agricultural extension programme has been provided in Table III.4. The following conclusions have been drawn from this table :

Except in the case of extension programmes like Farmers Training Centre and Crop Competetion the coverage of beneficiary households was relatively higher in all other programmes. The extent of coverage of beneficiary households under different extension programmes was as follows : Visit to soil testing laboratory and other demonstration plots (67 per cent), visit to tehsil seed farm (63 per cent), Kisan Mela (55 per cent), ABC demonstration plots (47 per cent), farmers demonstration meeting (39 per cent) and trial-cum-demonstration plots (27 per cent). In case of non-beneficiary households the proportions of households covered under different programmes were as follow : Visit to tehsil seed farm (45 per cent),

visit to ABC demonstration plots (30 per cent), visit to soil testing laboratory (28 per cent), Kisan Mela (25 per cent), other demonstration plot (23 per cent), farmers' demonstration meeting (20 per cent) and trial-cum-demonstration farm (18 per cent).

Table III.5 provides information pertaining to how frequently the sample farmers approached the different extension workers. The conclusions drawn from this table are as follow :

The proportion of households not consulting the extension workers was higher among non-beneficiary households as compared to beneficiary households. This percentage of households not consulting the extension workers was significantly higher in the case of non-beneficiary households for SMS*, DAO* and ASC.*

The village Leval Worker (VLW) is expected to pay frequent visits to villages. If we adopt the norm of at least 6 contacts or meetings with VLW during one year as ideal, then the percentage of beneficiary households having atleast 6 meetings with VLW was as high as 70, the corresponding figure for non-beneficiary households being 45 per cent only. The frequency of contact with farmer goes on decreasing in both types of households with the higher cadre. Nearly 63 per cent of the beneficiary households had consulted Assistant Soil Chemist (ASC) as compared to 30 per cent for non-beneficiary households. Seven out of the 12 non-beneficiary households had reported old contacts with ASC as their soil was tested prior to reference year. Better contacts with the extension workers in the case of both groups of households were partly due to the Benor scheme which emphasized frequent visits to farmers.

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*SMS = Subject Matter Specialist,
DAO = District Agriculture Officer,
ASC = Assistant Soil Chemist

b) Awareness : An attempt was made to find out the knowledge of selected farmers about the existence of soil testing laboratory in the district and the type of arrangements made for such soil test. This information has been furnished in Table III.6. The following conclusions have been drawn from this table :

The proportion of respondants having knowledge about the existence of soil testing laboratory in the district was considerably higher among beneficiary households (98 per cent) as compared to non-beneficiary households (68 per cent).

About 90 per cent of the beneficiary households knew the arrangements for getting soil tested through VLW, the corresponding figure for non-beneficiary household being 33 per cent. Thus, awareness about getting the soil tested through VLW was poor among non-beneficiary households. However, regarding the arrangements for getting the soil tested directly by paying fees, there was no marked variation between the two groups of households. Such awareness about getting the soil tested directly by paying fees was also quite poor.

c) Reasons for Non-adoption : Table III.7 provides distribution of non-beneficiary households according to different reasons for not getting their soil tested during the reference year 1979-80. Various reasons suggested in order of their importance were as follow: ignorance about soil testing facility (50 per cent), followed by no major problem in the soil (20 per cent), soil was tested prior to reference year (17.5 per cent) non-availability of VLW's service (7.5 per cent) and apathy towards soil testing service (5 per cent).

III

Adoption of Soil Testing Service by the Beneficiary Households during 1979-80

This section deals with adoption of the soil testing service by farmers with respect to crops covered, number of seasons covered, recurrence of soil samples, use level of fertilizer on soil tested plots and its impact on crop cultivation. In addition, the method of taking soil samples and attitude/opinion of the beneficiary households regarding soil testing service has also been discussed.

Crops covered : Table III.8 provides information on village-wise and crops-wise number of soil samples collected from beneficiary households. According to the record of soil testing laboratory, there were in all 113 soil samples, but some plots were merged at the farm level for taking the crops and as a result the total number of plots thus arrived at was 74 only.* It is revealed from this table that there were in all 74 soil tested plots out of which 21 plots were alloted to American cotton and 51 plots to wheat. Gram claimed only two plots. The average area per sample for American cotton, wheat and gram was 2.1 hectares, 2.4 hectares and 1.7 hectares respectively. Thus, total area as well average area per sample claimed by wheat was the highest followed by American cotton and gram.

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* In Tables III.8, III.9, III.10 and III.11 the analysis of soil tested plots has carried out as per the crop pattern reported by the sample beneficiary farms, i.e. for 74 plots.

In Table III.9 details about distribution of beneficiary households with respect to number of seasons covered, number of crops covered, recurrence of soil sample over number of years, reasons for not covering entire land under soil testing and their willingness to pay charges for soil testing have been furnished. The following conclusions can be drawn from this table :

Number of seasons covered : A large majority of the beneficiary households (56) had sent their soil samples for one season only. It is surprising to note that in an area with better irrigation facility soil samples for two or more seasons were not taken by the sample beneficiary households.

Number of crops covered : As many as 56 beneficiary households had sent their samples only for one crop. When this question was discussed with the beneficiary households, they reported that if facility for testing Zn, Fe and Borone is created, they would certainly go for soil testing for crops like sugarcane, sugarbit and fodder.

Recurrence of soil samples over number of years : There were 36 sample beneficiary households who had sent their soil samples for the first time. About 20 households had sent their samples for two times. Only two households each had sent the samples for three and four times. Thus, about 40 per cent of beneficiary households were not new to this service and this indicates their interest and faith have been sustained in the soil testing service.

Reasons for not covering entire land under soil testing: The reasons which were listed for not covering the entire area under soil testing, in order of their

importance were as follow : no need for other crops (30), prefered alternate year (15), unawareness (6) and left to VLW (4). One beneficiary reported lack of irrigation facility as a constrain and four respondants did not give any reply.

Willingness to pay charges for soil testing : This service is free at preset. An attempt was made to find out whether the farmers are willing to pay charges for soil testing service. Out of 60 sample beneficiary households only 40 had replied to this question. From among those who had replied, 14 were ready to pay reasonable charges, 12 were ready to pay whatever charges, one beneficiary was willing to pay Rs.2 per sample and 13 beneficiaries demanded free service. Thus, 45 per cent of the beneficiary households were ready to pay either reasonable or whatever charges that may be fixed for soil testing service. If token charge is levied, then the financial strengency for this service can be removed to some extent.

Distribution of soil tested plots as per fertilizer use level : Table III.10 provides bi-variate distribution of village-wise soil tested plots according fertilizer use level. There were 74 soil tested plots. Fertilizer recommendation and actual application on these plots in terms of N P K per hectare were compared. The soil tested plots in order to numerical importance were categorized as follows : Application of N P K was more on 29 plots and lower on 7 plots. P K application was more on 17 plots. Application of N K was lower on 8 plots. Application of N P was more on 4 plots and less on 5 plots. Thus, the above results show that fertilizer application in terms of NPK on none of the soil tested plots was as per the recommendation of soil testing laboratory.

Use Level of Fertilizer and Yield Level of Crops :

Table III.11 provides details about performance of different crops on beneficiary and non-beneficiary farms. The crops selected for comparision (for both types of farms) are American cotton, wheat and gram because soil testing was reported by beneficiary households for these crops only. The conclusions drawn from this table are as follows :

Except wheat the other two crops did not prove their superiority in terms of yield for soil tested plots over either non-soil tested plots on beneficiary farms or on non-beneficiary farms.

The per hectare yield of wheat on soil tested plots was 4023 kgs., whereas corresponding figures for non-tested soil plots on beneficiary farms and on non-beneficiary farms were 3725 kgs. and 3136 kgs. respectively. The use level of fertilizer and yield level did not reveal any trend but it is observed that for the respective package of nutrients like N P K or N P the yield level in value terms (considering main product and by-product together) was higher where the use level was lower than where the use level was higher.

Method : Adoption of scientific method for collecting the soil samples is equally important for analysis. Factors such as the average size of the plot per soil sample, depth of soil sample, number of spots per soil sample, quantity of soil per soil sample, instrument used for soil sample collection are important for scientific analysis.

Generally, 1 to 10 grams of soil is used for purpose of the chemical analysis. Now this sub-sample

can be said to be representative if it has been drawn from 500 grams of composite sample (soil samples collected from 4 to 8 places and then mixed up make a composite sample) from an area of 0.5 hectare to a depth of 15 centimeter (weighing about one million kgs., it amounts to just one billion to hundred millionth of the total soil volume). Hence it is necessary to examine the method of soil sample collection for proper evaluation of the programme. The soil tested plots reported by SSTL have been considered for this analysis. There were 113 such plots. According to the crop pattern reported by farmers some plots were merged by sample farmers and hence the total plots were 74.

Average Size of the Tested Plots : Table III.12 provides distribution of soil samples according to average size of the tested plots. A majority of the soil samples (87) had covered average size of holding of more than 0.60 hectare. Only 8 soil samples had average size of land which was less than the minimum required area, i.e. less than 0.50 hectare.

Number of Spots in the Field : Table III.13 provides information pertaining to distribution of soil samples according to number of spots in the field per soil sample. If 4 to 8 spots in the field per soil sample are considered as adequate for scientific composite sample then all the soil samples (except 10) represented 4 to 10 spots. Thus, majority of the soil samples represented fairly composite samples. There were six soil samples for which beneficiary could not reply regarding the number of spots represented per soil sample.

Quantity of Soil : The data regarding distribution of soil samples according to quantity of soil taken per sample have been presented in Table III.14. A composite sample weighing half a kg. of soil is considered sufficient for analysis. For a majority of the soil samples (89) the quantity of soil taken per sample was in the range of 250 to 500 gms., whereas for 18 samples the soil taken per sample was in the range of 500-750 gms. There were 2 soil samples for which beneficiary could not reply regarding the quantity of soil taken per sample. On the whole the quantity of soil taken per sample was adequate.

Tools Used : Table III.15 provides information on distribution of soil tested plots according to tools used for soil collection. The most commonly used instrument reported was Kassi, i.e. out of 113 soil samples, the soil sample was collected by Kassi for 95 soil sample. Spade was used to collect soil for 12 soil samples. The beneficiary households could not reply regarding tools used for 6 soil samples.

Sampled Layer : Table III.16 provides information regarding distribution of soil samples according to depth per soil sample. The proper depth can be taken as plough depth, viz., 15 cms. and more from the surface according to the type of the crop. From among 113 soil samples, excepting 6 soil samples for which beneficiary did not reply, all other soil samples were collected from surface soil layer ranging from 15 cms. to 30 cms. Thus, improper soil depth was not reported in any case.

Attitudes and Opinions of Beneficiary Households Regarding Soil Testing Service :

It is heartening to note that a majority of the sample beneficiary households reported satisfaction for this service and some of them had also given some useful suggestions for the improvement of this service. They had also reported some problems for extension service as a part of soil testing service. These aspects are covered here.

The main source of information for soil testing service among beneficiary households was VLW followed by other farmers and demonstration programmes. For the majority of the beneficiary households the soil sample was collected by VLW. No beneficiary had reported his ignorence about soil sample collection, i.e. soil sample was collected with his knowledge or in his presence or in the presence of his family members.

The crux of the problem is that after sending the soil samples, majority of the beneficiary households were not conveyed the results in time. This might have happened because soil test reports might not have been despatched to VLW in time or VLW might have received the reports but may not have communicated it to the farmers concerned. The beneficiary farmers suggested that the soil test reports should be sent directly to them. The VLW should explain to them the results suggested in the reports. As a second alternative to avoid the delay in sending or conveying the soil test results to the farmers, the facility of the mobile van should be provided once in a season prior to sowing period so that soil test could be done in the presence of the farmers and the results could also be explained to them on the site.

Out of 60 beneficiary households only three beneficiary households had reported that soil test results were not communicated to them by VLW. Results of the soil test reports were conveyed to others by VLW but they were not conveyed in time. Moreover, it was also suggested that soil test reports should be made self-explanatory for the farmers, i.e. they should be as simple as possible in terms of nutrients suggested to farmers because illiterate farmers cannot be expected to do mathematical conversion for particular brand of fertilizer to be applied with respect to suggested level of nutrients.

As per present arrangement the VLW is supposed to explain these results to the beneficiary farmers but majority of the beneficiary farmers could not avail the VLW's service for this purpose. This again emphasises the need to providing mobile van facility in the villages.

It was suggested that for the propogation of this programme, ABC demonstration plots should be arranged year after year by rotation in the villages. The results obtained on such ABC demonstration plots would automatically inspire the farmers to adopt soil testing service. Moreover, documentary films regarding soil testing service should also be shown to the farmers.

It was also suggested that follow up of soil test recommendation should be intensively taken up by the laboratory staff itself in terms of sending the reports in time, in explaining the results and in providing technical guidance required for adopting soil test service. This would definately bring positive and encouraging results for this service on the farmers field.

It was encouraging to note that some farmers were not happy with the existing facility with the SSTL. They demanded more facilities in terms of Zn, Fe, Borone test required for sugarcane, sugarbit, fodder and wheat. In the absence of such facilities some of them went to soil testing laboratory located at Ludhiana in Punjab.

Table III.1

Basic Data about Beneficiary and Non-Beneficiary Households during 1979-80

Particulars		Beneficiary	Non-beneficiary
Membership of Credit Co-operative Society :			
	Member	49 (81.7)	22 (55.0)
	Non-member	11 (18.3)	18 (45.0)
Literacy :	Illiterate	9 (15.0)	11 (27.5)
	Literate	51 (85.0)	29 (72.5)
Experience of farming :	1-5 years	7 (11.7)	5 (12.5)
	6 years & above	53 (88.3)	35 (87.5)
Caste composition:	Sikh	51 (85.0)	36 (90.0)
	Jat	8 (13.3)	4 (10.0)
	Others	1 (1.7)	-
Age-group :	15-59 years	53 (88.3)	33 (72.5)
	60 years & above	7 (11.7)	7 (17.5)

Note : Figures in brackets indicate percentage to total number of households in the respective group.

Table III.2

Land Use Pattern for Beneficiary and Non-Beneficiary Households during 1979-80

Sr. No.	Particulars about land	Beneficiary households		Non-beneficiary h.hs.	
		Total area (Hects.)	Average area (Hects.)	Total area (Hects.)	Average area (Hects.)
1	Owned	431.75	7.20	220.28	5.50
2	Leased-in	8.56	0.14	-	-
3	Operational holding*	440.31	7.34	220.28	5.50
4	Current fallow	77.55	1.29	48.37	1.21
5	Net cultivated	362.76	6.05	171.91	4.30
6	Area sown more than once	118.42	1.97	24.29	0.61
7	Gross cropped area	481.18	8.02	196.20	4.90
8	Net irrigated area	344.38	5.74	164.42	4.11
9	Gross irrigated area	458.19	7.64	188.71	4.72
10	Crop intensity	-	132.64	-	114.13
11	Irrigation intensity	-	133.05	-	114.77

* Operational holding : Land owned + Leased-in land + Mortgaged-in land - Leased-out land - Mortgaged-out land.

Table III.3

Crop Pattern for Beneficiary and Non-Beneficiary Households during 1979-80

Season	Name of the crop	Beneficiary		Non-beneficiary	
		Total area (Hects.)	% of irrigated area with respect to total area under crop (Hects.)	Total area (Hects.)	% of irrigated area with respect to total area under crop (Hects.)
1	2	3	4	5	6
KHARIF	American cotton	163.92 (34.07)	100.00	57.63 (29.37)	100.00
	Deshi cotton	12.72 (2.64)	95.44	8.89 (4.53)	100.00
	Sugarcane	6.28 (1.31)	100.00	1.96 (1.00)	100.00
	Guvar	21.84 (4.54)	41.25	10.40 (5.30)	70.00
	Jowar fodder	16.15 (3.36)	100.00	5.98 (3.05)	96.15
	Bajri fodder	0.23 (0.05)	100.00	0.23 (0.12)	100.00
	Mung	0.69 (0.14)	-	-	-
	Green manure	2.78 (0.57)	100.00	-	-
	Orange matta garden	-	-	5.56 (2.83)	100.00

Contd....

Table III.3 Contd..

1	2	3	4	5	6
KHARIF	Total	224.61 (46.68)	93.72	90.65 (46.20)	96.30
RABI	Wheat	168.66 (35.05)	100.00	67.42 (34.36)	100.00
	Gram	55.67 (11.57)	84.86	27.96 (14.25)	85.19
	Taramira	0.46 (0.10)	-	-	-
	Sarso	24.98 (5.19)	100.00	8.89 (4.53)	100.00
	Sugarbit	1.38 (0.28)	100.00	0.23 (0.12)	100.00
	Barsim fodder	4.50 (0.94)	100.00	0.59 (0.30)	100.00
	Jowar fodder	0.69 (0.14)	100.00	0.46 (0.24)	100.00
	Rajko	0.23 (0.05)	100.00	-	-
	Total	256.57 (53.32)	96.54	105.55 (53.80)	96.08
	Gross cropped area	481.18 (100.00)	95.22	196.20 (100.00)	96.18

Note : Figures in brackets indicate percentages to gross cropped area.

Table III.4

Coverage of Cultivators under Different Items of Agricultural Extension Programme during 1979-80

Sr. No.	Item	Beneficiary		Non-beneficiary	
		No.	%	No.	%
1	Farmers' Training Centre	1	1.7	3	7.5
2	Farmers' [illegible] Campaign Shibir	2	3.4	1	2.5
3	Farmers' Tour Programme	6	10.2	4	10.0
4	Farmers' Demonstration Meeting	23	38.5	8	20.0
5	Crop Competetion Programme	1	1.7	1	2.5
6	ABC Demonstration Plots	28	46.8	12	30.0
7	Other Demonstration Plots	40	66.6	9	22.5
8	Kisan Mela	33	55.0	10	25.0
9	Tehsil Seed Farm	38	63.4	18	45.0
10	Trial-cum-Demonstration Farm	16	26.7	7	17.5
11	Soil Testing Laboratory	40	66.6	11	27.5
12	Mobile Soil Testing Laboratory	3	5.0	1	2.5
13	Overall		60 (100.0)		40 (100.0)

Table III.5

Distribution of Cultivator Households According to Number of Times the Decision-maker Consulted Different Extension Workers during 1979-80

No. of times consulted	Village Level Workers & Other Extension Workers											
	Beneficiary						Non-beneficiary					
	VLW	AEO	BDO	SMS	DAO	ASC	VLW	AEO	BDO	SMS	DAO	ASC
1	-	-	-	-	2 (3.4)	-	-	2 (5.0)	2 (5.0)	1 (2.5)	1 (2.5)	1 (2.5)
2	1 (1.7)	3 (5.1)	3 (5.1)	1 (1.7)	7 (11.6)	3 (7.5)	2 (5.0)	2 (5.0)	3 (7.5)	1 (2.5)	3 (7.5)	2 (5.0)
3	1 (1.7)	10 (16.6)	13 (21.5)	17 (28.3)	9 (15.0)	24 (40.0)	1 (2.5)	9 (22.5)	8 (20.0)	7 (17.5)	4 (10.0)	8 (20.0)
4	3 (5.1)	14 (23.3)	3 (5.1)	10 (16.6)	5 (8.3)	11 (18.4)	7 (17.5)	6 (15.0)	1 (2.5)	1 (2.5)	-	1 (2.5)
5	11 (18.1)	7 (11.6)	1 (1.7)	1 (1.7)	-	-	8 (20.0)	1 (2.5)	-	-	-	-
6	24 (40.0)	3 (5.1)	1 (1.7)	4 (6.7)	-	-	11 (27.5)	1 (2.5)	-	-	-	-
7 & above	18 (30.0)	1 (1.7)	1 (1.7)	-	-	-	7 (17.5)	-	-	-	-	-
Not consulted	2 (3.4)	22 (36.6)	38 (63.2)	27 (45.0)	37 (61.7)	22 (36.6)	4 (10.0)	19 (47.5)	26 (65.0)	30 (75.0)	32 (80.0)	28 (70.0)
Total	60 (100.0)	60 (100.0)	60 (100.0)	60 (100.0)	60 (100.0)	60 (100.0)	40 (100.0)	40 (100.0)	40 (100.0)	40 (100.0)	40 (100.0)	40 (100.0)

Note : Figures in brackets indicate percentage to total number of households in respective group.

VLW = Village Level Workers, AEO = Agriculture Extension Officer, BDO = Block Development Officer, SMS = Subject Matter Specialist, DAO = District Agriculture Officer, ASC = Assistant Soil Chemist

Table III.6

Knowledge about Soil Testing Service

Sr. No.	Subject of awareness	Beneficiary		Non-beneficiary	
		No.	%	No.	%
1	Existence of soil testing laboratory in the district	59	98.33	27	67.50
2	Arrangement for soil testing through VLW	54	90.00	13	32.50
3	Arrangement for soil testing directly by paying fees	5	8.33	3	7.50
4	Total number of cultivators in the sample	60		40	

Table III.7

Distribution of Non-Beneficiary Households According to Reasons for Not Getting their Soil Tested During 1979-80

Reasons	No.	%
1. Ignorance about ST facility	20	50.00
2. Non-availability of VLW's service	3	7.50
3. Apathy towards ST services	2	5.00
4. No major problem in soil	8	20.00
5. Soil was tested prior to reference period	7	17.50
	40	100.00

Table III.8

Bi-variate Distribution of Soil Tested Plots According to Crop and Village During 1979-80

Crop	18 Z		19Z		9F		5HH		8D		14Q		Total	
	No.	Area (hec.)	No.	Area (hec.)	No.	Area (hec.)	No.	Area (hec.)	No.	Area (hec.)	No.	Area (hec.)	No.	Area (hec.)
American cotton	7	11.80 (1.7)	-	-	2	10.41 (5.2)	1	1.85 (1.9)	11	18.28 (1.7)	-	-	21	42.34 (2.1)
Wheat	11	22.67 (2.6)	13	24.29 (1.9)	11	13.64 (1.2)	7	14.12 (2.2)	1	3.00 (3.0)	8	45.34 (5.7)	51	123.06 (2.4)
Gram	-	-	-	-	-	-	-	-	-	-	2	3.47 (1.7)	2	3.47 (1.7)
TOTAL	18	34.47 (1.9)	13	24.29 (1.9)	13	24.05 (1.8)	8	15.97 (2.0)	12	21.28 (1.8)	10	48.81 (4.9)	74*	168.87 (2.3)

* As per soil testing laboratory, there were in all 113 samples but as per crop pattern data some soil tested plots were merged for taking certain crops and as a result it amounted to 74 plots.

Note: Figures in brackets indicate average area covered per soil sample

Table III.9

Details about Beneficiary Households Regarding Soil Testing Samples.

Sr. No.	Particulars about soil sample		No.
1	Number of seasons covered :	One	56
		Two	4
2	Number of crops covered :	One	56
		Two	4
3	Recurrence of soil samples: over no. of years	One	36
		Two	20
		Three	2
		Four	2
4	Reasons for not covering entire land under soil testing :		
	a) Alternate year		15
	b) Unawareness		6
	c) It is left to VLW		4
	d) No need for other crops or plots		30
	e) Lack of irrigation facility		1
	f) No reply		4
5	Willingness to pay charges for soil testing :		
	a) Ready to pay reasonable charges		14
	b) Ready to pay whatever charges		12
	c) Free service		13
	d) Rs.2 per sample		1
	e) No reply		20

Table III.10

Bi-variate Distribution of Soil Tested Plots According to Village and Fertilizer Use Level during 1979-80

Village	Category of plots according to fertilizer use							
	NPK over	NPK below	PK over	NP over	NP below	NK below	P over	Total
18Z	11 (61.1)	1 (5.6)	4 (22.2)	-	2 (11.1)	-	-	18 (100.0)
19Z	3 (23.0)	-	7 (53.9)	1 (7.7)	-	-	2 (15.4)	13 (100.0)
9F	7 (53.9)	-	2 (15.4)	-	-	3 (23.0)	1 (7.7)	13 (100.0)
5HH	4 (30.8)	2 (15.4)	1 (7.7)	1 (7.7)	2 (15.4)	3 (23.0)	-	13 (100.0)
8D	2 (22.2)	4 (44.5)	1 (11.1)	2 (22.2)	-	-	-	9 (100.0)
14Q	2 (25.0)	-	2 (25.0)	-	1 (12.5)	2 (25.0)	1 (12.5)	8 (100.0)
Total	29 (39.2)	7 (9.5)	17 (23.0)	4 (5.4)	5 (6.7)	8 (10.8)	4 (5.4)	74 (100.0)

Note : Figures in brackets indicate percentage to total plots in a village.

Table III.11

Details about Performance of Different Crops on Beneficiary's and Non-beneficiary's Farms

Crop	Yield	Beneficiary with soil tested plots according to fertilizer use										Non-beneficiary
		NPK over	NPK below	PK over	NP over	NP below	NK below	P over	STP but no use of fertilizer	Overall	Non-tested soil plots	
American cotton	kgs/hect.	1232	1527	1483	1340	1273	-	-	-	1341	1528	1208
	Rs./hect.	5014	6886	6802	6093	5729	-	-	-	5856	-	-
	Net return per rupee investment(Rs.)	0.81	3.54	2.43	2.34	3.38	-	-	-	1.21	-	-
Wheat	Kgs./hect.	4226	4310	4304	3663	3885	3634	3765	-	4023	3725	3116
	Rs./hect.	5594	5716	5753	4821	5144	4705	4822	-	5300	-	-
	Net return per rupee investment(Rs.)	1.71	2.37	2.62	1.49	2.19	1.09	2.04	-	1.72	-	-
Gram	Kgs./hect.	-	-	-	-	-	1552	-	866	1035	1151	847
	Rs./hect.	-	-	-	-	-	3259	-	2165	2530	-	-
	Net return per rupee investment(Rs.)	-	-	-	-	-	2.22	-	1.35	1.66	-	-

Table III.12

Distribution of Soil Tested Plots According to Average Size of Tested Plots

Average size of tested plots (Hects.)	No.	%
0.00 to 0.20	-	-
0.21 to 0.40	8	7.08
0.41 to 0.60	18	15.93
0.61 to 0.80	18	15.93
0.81 to 1.00	10	8.85
1.01 & above	59	52.21
Overall	113	100.00

Table III.13

Distribution of Soil Tested Plots According to Number of Spots Represented

Number of spots covered per soil sample	No.	%
Not knowing	6	5.31
Three	4	3.54
Four	18	15.93
Five	34	30.09
Six	40	35.40
Seven	-	-
Eight	3	2.65
Nine	-	-
Ten	8	7.08
Overall	113	100.00

Table III.14

Distribution of Soil Tested Plots According to Quantity of Soil taken

Qty. (gms.)	No. of plots	%
Not knowing	2	1.77
Below 250	4	3.54
250-500	89	78.76
500-750	18	15.93
750-1000	-	-
Overall	113	100.00

Table III.15

Distribution of Soil Tested Plots According to Tools Used

Tools	Number of samples	
	No.	%
Not knowing	6	5.31
Pick axe	-	-
Spade	12	10.62
Sickle	-	-
Plough share	-	-
Kassi	95	84.07
Overall	113	100.00

Table III.16

Distribution of Soil Tested Plots According to Depth of Sampled Layer

Depth in cm. from the surface	No. of samples	
	No.	%
Not knowing	6	5.31
Upto 15	35	30.97
Upto 22	42	37.17
Upto 30	30	26.55
Loose soil	-	-
Overall	113	100.00